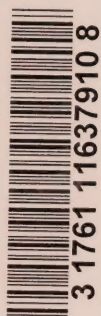


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NATIONAL ENERGY BOARD REASONS FOR DECISION

In the Matter of an Application under
the National Energy Board Act

of

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
PART A -LICENCES

MARCH 1980

1 Canada

2 NATIONAL ENERGY BOARD

3 REASONS FOR DECISION

In the Matter of the Application Under
the National Energy Board Act

of

British Columbia Hydro and Power Authority

Part A - Licences

March 1980

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NATIONAL ENERGY BOARD

IN THE MATTER OF an application by British
Columbia Hydro and Power Authority for:

Part A. The renewal, with modifications,
of Licences EL-85, EL-87, EL-88
and EL-89, to export power under
Part VI of the National Energy
Board Act; and

Part B. The modification or replacement
of Certificate of Public
Convenience and Necessity EC-29.

(File: 1923-4/B4-6)

HEARD at Vancouver, British Columbia on 11 and 12 December 1979
and 22, 23, 24, 25, 28 and 29 January 1980

BEFORE:

L.M. Thur	Presiding Member
J.L. Trudel	Member
R.B. Horner	Member

APPEARANCES:

W.D. Mitchell	)	British Columbia Hydro and
D.C. Duff	)	Power Authority
D.A. Austin)	
R. Edwards	)	Attorney General for British
	)	Columbia
D. Melnychuk	)	British Columbia Institute of
	)	Agrologists
C. D'Arcy	)	British Columbia
R. Skelly	)	New Democratic Party Caucus
B. Ottway)	
G. Kenyon	)	B.C. Wildlife Federation
D. Anderson)	
C. Stainsby	)	Canadian Scientific Pollution
M. Margolick	)	and Environmental Control Society
A. Hulbert	)	City of Port Moody, Environmental
L. Holmes	)	Protection Committee

P. Dewdney	)	Cominco Limited
M. Rush	)	Communist Party of Canada
B. York)	
D. Rosenbloom	)	Council for Yukon Indians
J. Aldridge)	
D. Bryan	)	Council of Forest Industries
R. Duggans	)	of British Columbia
J. Lewis	)	Federation of British Columbia
	)	Naturalists
P. Chataway	)	Greenpeace Okanagan
C. Hartwig	)	Herself
M. Anderson	)	Ladner Environmental Office
K. McAllister with	)	Himself and Canadian Coalition
J. Black	)	for Nuclear Responsibility
D. Gilbey	)	Municipal Council of Hudson's
	)	Hope
P. Michiel	)	Peace Valley Environmental
	)	Association
K. Roberts	)	Sierra Club of Western Canada
I. Fox)	
E. Hamilton	)	Skeena Protection Coalition
S. Rising-Moore	)	Texada Environmental Association
L. Mandell)	
L. Pinder	)	Union of British Columbia Indian
R. Salter	)	Chiefs
A. Thomlinson	)	United Fishermen and Allied
J. Nichol	)	Workers' Union
J. Russell)	
P. Steele)	Westcoast Transmission Company
)	Limited
K.J. MacDonald)	National Energy Board
A.R. Macdonald)	

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ABBREVIATIONS USED IN THE REPORTFor Units of Measurement

gigawatt-hour (1 million kW.h)	:	GW.h
kilometre	:	km
kilovolt	:	kV
kilowatt-hour	:	kW.h
megawatt	:	MW
megawatt-hour	:	MW.h

For Names

Aluminum Company of Canada Limited	)	"Alcan"
Attorney-General of the Province of British Columbia	) )	"the Attorney-General"
Bonneville Power Administration	)	"Bonneville"
British Columbia Hydro and Power Authority	) )	"the Applicant" or "B.C. Hydro"
British Columbia Institute of Agrologists	) )	"the Institute"
British Columbia New Democratic Party Caucus	) )	"the NDP"
B. C. Wildlife Federation	)	"the Federation"
Calgary Power Limited	)	"Calgary Power"
Canadian Scientific Pollution and Environmental Control Society	) )	"SPEC" or "the Society"
Cominco Limited	)	"Cominco"
Communist Party of Canada	)	"Communist Party"
Federation of British Columbia Naturalists	) )	"the Federation"
Greenpeace Okanagan	)	"Greenpeace"

Ladner Environmental Office	)	"Ladner"
Municipal Council of Hudson's Hope	)	"the Council"
National Energy Board	)	"the Board" or "NEB"
National Energy Board Act	)	"NEB Act" or "the Act"
Puget Sound Power and Light Company	)	"Puget"
Sierra Club of Western Canada	)	"Sierra Club" or "the Club"
Skeena Protection Coalition	)	"Skeena" or "the Coalition"
Texada Environmental Association	)	"Texada"
Union of British Columbia Indian Chiefs	)	"B.C. Indian Chiefs"
United Fishermen and Allied Workers' Union	)	"the Union" or "the Fishermen"
Washington Water Power Company Limited	)	"Washington Water Power"
West Kootenay Power and Light Company Limited	)	"West Kootenay"

THE APPLICATION

In an application dated 16 May 1979, British Columbia Hydro and Power Authority applied to the Board for renewal, with modifications, of Licences EL-85, EL-87, EL-88 and EL-89, which will be referred to as Part A of the application. The principal modifications requested are increases in the maximum quantities to be authorized for export.

The application for authorization of exports for the period 1 October 1979 to 30 September 1984 was in four parts, as follows:

- I. Firm power and energy as a sale transfer to the Point Roberts Service Area of Puget Sound Power and Light Company, the rate not to exceed 7 MW and the quantity not to exceed 32 GW.h per year. (This part would replace Licence EL-85, which authorizes equivalent exports up to 6 MW and 25 GW.h per year.)
- II. Power as a carrier transfer at Douglas, B.C. and Nelway, B.C. for simultaneous return to Canada ("loop power flow") up to 2 000 GW.h per year. (This part would replace Licence EL-87 which authorizes exports of power as a carrier transfer up to 800 GW.h per year.)
- III. Firm power and energy as sale and equichange transfer at Douglas and Nelway up to 3 000 GW.h per year. (This part would replace Licence EL-88 which authorizes exports of firm energy up to 2 000 GW.h per year.)
- IV. Interruptible energy as sale, equichange, storage, adjustment and carrier transfers at Douglas and Nelway, the quantity not to exceed 10 000 GW.h per year, less exports under Part III. (This part would replace Licence EL-89 which authorizes interruptible exports up to 7 200 GW.h per year, less exports under EL-88.)

The maximum total export applied for, excluding carrier transfers for return to Canada, is 10 032 GW.h per year, comprised of 32 GW.h under Part I and 10 000 GW.h under Parts III and IV.

By letter dated 13 June 1979, B.C. Hydro amended its application to apply also for the modification or replacement of its Certificate of Public Convenience and Necessity, EC-29, which will be referred to as Part B of the application.

With two letters dated 14 December 1979, the Applicant supplied "revised" and "additional" information relating to load and supply estimates.

AGREEMENTS

This section of the report outlines the various agreements relevant to the application which were filed by the Applicant.

International Exchange Agreement with Bonneville Power Administration

The exchange agreement, dated 27 August 1968 and the amendatory agreement dated 26 October 1978, between Bonneville and B.C. Hydro defines the points of interconnection and provides for the exchange of power between the parties.

The agreement terminates at the earlier of the date of termination of B.C. Hydro's export licences or 30 June 1988.

International Transmission Agreement with Bonneville Power Administration

The transmission agreement dated 26 October 1978 between Bonneville and B.C. Hydro provides for transmission service between the Blaine, Washington and Nelway, British Columbia points of interconnection to the intertie points with the high voltage lines to California, for transmission service between Waneta, Washington and Nelway, British Columbia and for exchange accounting, measurement, scheduling arrangements and other matters.

The agreement terminates 30 March 2020 or earlier upon twelve months' notice by either party.

International Agreement with Puget Sound Power and Light Company

The agreement, dated 1 July 1976 between B.C. Hydro and Puget, provides for B.C. Hydro to supply firm power and energy for distribution in the Point Roberts area of the United States.

The power is supplied at 60 hertz at 25 kV near the international boundary at the south end of 56th Street, Tsawwassen, B.C. via the international power line authorized by NEB Certificate EC-29.

Puget agrees to pay rates defined in B.C. Hydro Schedule 1211, applicable to Canadian customers in the same class, plus a surcharge of 10 per cent.

The agreement may be terminated by either party in September of any year, provided notice is given at least six months before the previous September.

International Agreement with Washington Water Power Company

By letter agreement dated 11 July 1978, B.C. Hydro agreed to sell, and Washington Power agreed to take or pay for, a total of 2 279 040 MW.h of interruptible energy during the period 1 September 1978 to 30 June 1984.

A fixed schedule of rates applicable to summer and winter seasons in each year is included in the agreement.

Agreement with the Aluminum Company of Canada Limited

By an agreement dated 14 July 1978 between Alcan and B.C. Hydro, it was agreed that Alcan would sell, and B.C. Hydro would buy, a minimum of 1 200 GW.h of energy per calendar year at a maximum demand of 175 MW in the period 1 January 1979 to 31 December 1983.

The price to be paid by B.C. Hydro is 7.0 mills per kW.h with some escalation and adjustments.

The agreement is conditional upon B.C. Hydro obtaining and maintaining a NEB licence for export of energy purchased under the agreement.

REASONS FOR DECISION - PART B

The hearing of Part B of the application, the modification or replacement of Certificate of Public Convenience and Necessity EC-29, was completed on 12 December 1979.

The Board's decision on Part B of the application is published separately in "Reasons for Decision, British Columbia Hydro and Power Authority, Part B - Certificate, January 1980."

BACKGROUND TO PART A

The Applicant, British Columbia Hydro and Power Authority, is a crown corporation in right of the Province of British Columbia. B.C. Hydro owns and operates power supply facilities that provide service to the greater part of the province. The main exception is the area served by Cominco Ltd. and its subsidiary, West Kootenay Power and Light Company Limited. The map included as Appendix 1 of this report shows the main generation and transmission facilities of B.C. Hydro.

The system is interconnected to the north with the Alcan system at Kitimat, to the east with the system of Calgary Power Ltd., an investor-owned utility in the Province of Alberta, in the south-eastern part of British Columbia with the system of Cominco, and to the south with the system of Bonneville. Bonneville is an agency of the United States Government, with extensive generation and transmission facilities in the Pacific Northwest area of the United States.

Licence EL-86, which expired 30 September 1979, authorized the export of power as a carrier transfer through Bonneville's circuits to enable B.C. Hydro to supply the eastern portion of its system which was isolated. A new 500 kV transmission line in Canada running from Nicola to Nelway was placed in service in 1978 and there is no longer any requirement for regular carrier service with Bonneville.

There are four international power lines connecting the B.C. Hydro and Cominco systems to the Bonneville system, as shown by the maps at Appendix 2. Two 500 kV lines cross the international boundary at Douglas, B.C., near Vancouver, and two 230 kV lines cross the border at Nelway, B.C. In addition, B.C. Hydro owns an international power line which supplies the isolated distribution system of Puget in the Point Roberts area.

This line appears on the upper map of Appendix 2 and its modification is the subject of the Reasons for Decision, Part B - Certificate dated January 1980.

To authorize the export of power over these various international power lines, the Applicant holds Licences EL-85, EL-87, EL-88, and EL-89. The licences were issued by the Board in June 1975⁽¹⁾ after a public hearing. All these licences were due to expire on 30 September 1979, but amending orders were issued by the Board extending them until 30 March 1980.

B.C. Hydro is a member of the Northwest Power Pool which also includes utilities in Washington and Oregon States as well as Cominco and Calgary Power.

(1) Reference: NEB Report to Governor in Council on the application of B.C. Hydro, June 1975.

NOTICES OF MOTION FOR ADJOURNMENT

Following the opening of the hearing of the application of B.C. Hydro on 11 December 1979, the Board was presented with Notices of Motion for Adjournment by four intervenors.

Ladner Environmental Office sought an adjournment of the proceedings until March 1980. The Association wished to obtain information from B.C. Hydro pertaining to the possible indemnification of residents of the Canadian Columbia River Basin. It stated, also, that time was sought in order to study changes which might be made by U.S. authorities to the contractual arrangements between Bonneville and certain U.S. purchasers. Additional time was requested also, to permit studies of prices for electricity.

The Canadian Scientific Pollution & Environmental Control Society, together with the Sierra Club of Western Canada, sought an indefinite adjournment of the hearing so that additional information could be sought from B.C. Hydro and be analyzed, following which the hearing should proceed.

The information sought by SPEC/Sierra from B.C. Hydro would include whether B.C. Hydro might bring additional generation into service earlier than would be necessary to supply Canadian loads; estimates of capital, environmental and other social costs of all additions to the generation system during the proposed licence period; estimated amounts of capital, environmental and other social costs incurred in Canada in respect of power and energy to be exported; a statement of gross revenues and net profit from hydro and thermal power and energy from firm and interruptible sales made under Licences EL-88 and EL-89; and environmental studies and reports relating to thermal generating units.

SPEC/Sierra stated it would use this information to prepare evidence regarding component costs of the export price for power and energy.

The Union of British Columbia Indian Chiefs sought an adjournment until March 1980 in order to have time to examine the

tables of power and energy demand, supply and surplus provided by the Applicant; to calculate environmental impact in greater depth; to search out "hidden" costs; and to examine in depth the schedule for B.C. Hydro's generation construction program for many years into the future.

The Fishermen sought an adjournment of four months. The Fishermen argued that the hearing should have a scope wider than that required by the application and stated that time was sought to make studies of what additional matters should be considered in relation to the development of energy policy in British Columbia.

The Notices of Motion for Adjournment were supported by eight other intervenors.

In reply, the Applicant asked for clarification of the areas in which the Board would be prepared to hear evidence and argued that the hearing should proceed according to a schedule which would permit new licences to be issued before the existing licences were due to expire on 31 March 1980.

DISPOSITION OF NOTICES OF MOTION

After consideration of the arguments with respect to adjournment, the Board rendered its decision on 12 December 1979. The text is reproduced in full in Appendix 6.

In summary, the Board stated that it would hear evidence to establish whether the generating system of B.C. Hydro had been constructed, or was being constructed, or would be operated in a different manner to meet export sales as opposed to domestic load within the period of the licences applied for. Only if the evidence established that such was the case would the Board hear any evidence to quantify additional costs in Canada attributable to the exports.

To allow time for intervenors to prepare their cases, the Board then adjourned the hearing of Part A of the application until 22 January 1980.

THE EVIDENCE

The Applicant furnished the information required by the NEB. The evidence that was presented is summarized below under the subheadings Witnesses, Load Forecasts, Generating Capacity and Additions, Surplus, Offers to Canadian Utilities, Export Markets, Loop Power Flows, Derivation of Requested Licence Limits, Export Prices, System Performance and Environmental Considerations.

Witnesses

The Applicant presented five witnesses as a panel, all professional engineers on the staff of B.C. Hydro. The Supervisor of the Transmission Planning Section gave evidence on transmission capability, system studies and load flow tests. The Assistant Superintendent of Operations dealt with system operations, inter-utility transactions and prices. The Assistant Manager of the Generation Planning Department testified on matters relating to generating plant construction and scheduling, supply capability and to the derivation of the requested licence limits. The Manager of the Economic Analysis Department gave evidence on economic projections, load forecasting methods and the load forecast. The Vice-President of Electrical Operations testified on matters relating to the policies of B.C. Hydro.

Load Forecasts

In describing the load forecasting methods of B.C. Hydro, a witness stated that new forecasts are prepared each year for the following two years and ten years. Information is gathered from offices throughout the province. This data is particularly relevant to the preparation of the two-year forecast. Industrial loads are forecast on an individual basis. General economic prospects are taken into consideration. These several forecasts are combined to derive the ten-year forecast which relies heavily on the judgement of senior officers.

B.C. Hydro distributes both electricity and natural gas in British Columbia and its forecasts include the two fuels. It was stated in evidence that B.C. Hydro does not make extensive use of computer models in forecasting nor does it prepare a total energy forecast for the province. The preparation of total energy forecasts is performed by the British Columbia Energy Commission.

In regard to the accuracy of past forecasts, evidence was given that B.C. Hydro has met, and plans to meet, all demands for service placed upon it by its Canadian customers.

Testimony showed the rate of growth of demand was slower in the past five years than in preceding decades and that the character of the load was changing. However, the load forecast witness felt that it was too soon to say whether a permanent change in the trend of growth of demand of electricity consumption has occurred.

The most recent forecast, supplied by the Applicant as additional information, was said to reflect B.C. Hydro's continuing reassessment of future loads. The load forecasts show an estimated growth of demand amounting to some $6\frac{1}{2}$ per cent per annum over the period of the licences applied for. The latest information showed a slight decrease in expected growth rate of residential demand and some increase in future growth rate of industrial demand, reflecting early indications of a possible upturn in industrial demand.

The evidence showed a 55 per cent capture rate for space heating by electricity in new dwelling units. The capture rate is 85 per cent on Vancouver Island where there is no supply of natural gas and is correspondingly lower on the mainland. The witness for the Applicant estimated that electricity now supplies 12 to 15 per cent of the total space heating market in the province.

Railway electrification has been studied at length but a witness for the Applicant testified that there are no plans for its implementation at present.

The policy witness for the Applicant testified that B.C. Hydro would meet the supply deficiency expected in the West Kootenay service area. The price at which the necessary power and energy would be delivered is still under negotiation.

Evidence was given that there is no realistic alternative supply to that provided by B.C. Hydro to Point Roberts. Continuing past practice, the future loads at Point Roberts are included in B.C. Hydro's domestic load forecast. The high forecast of annual growth of demand in Point Roberts, exceeding ten per cent per annum, is not due entirely to anticipated growth but represents, rather, a margin of safety added when forecasting load growth in such a small area.

Generating Capacity and Additions

The present generating capacity of B.C. Hydro is approximately 6 310 MW of which 5 087 MW is hydroelectric and the balance is thermal capacity at Burrard Generating Station and a number of small gas turbine plants.

To supply the load growth which is forecast in British Columbia during the requested licence period, B.C. Hydro is building three new hydroelectric stations, Peace Canyon, Seven Mile and Revelstoke, and is adding capacity at the existing G.M. Shrum plant. The Peace Canyon project is scheduled to have four units in service by the fall of 1980, with a dependable capacity of 700 MW. The largest development is at Revelstoke where three units with a dependable capacity of 1 350 MW total are scheduled to be in service in the spring of 1984. One additional 275 MW unit is planned to come in service at the G.M. Shrum plant in the spring of 1980. At Seven Mile two additional 176 MW units are scheduled to be in service by October 1980.

The total increase in dependable capacity provided by the above developments is 2 677 MW. Hydroelectric generation as a proportion of total system capacity is scheduled to increase from 82 per cent at present to 86 per cent by the end of the requested licence period.

Membership in the Northwest Power Pool requires B.C. Hydro to maintain a five per cent operating reserve at all times, in common with the other members. Evidence was given that the net effect of the operating reserve requirement was to reduce the amount of facilities required to be constructed in British Columbia by virtue of the support available from other members of the Pool in case of emergency. It was stated that when two parties are interconnected, the smaller system, in this instance B.C. Hydro, benefits more than the larger partner in regard to emergency backup because it has a larger reserve to draw upon.

It was stated that the activities of the Western Systems Coordinating Council do not influence domestic planning to meet domestic loads nor the disposal of the energy generated within the province.

B.C. Hydro has changed the method of calculating its reserve requirement to a probability method based on the observed failure rate of generating units. This method calculates the reserve required over the annual peak load to ensure that, taking forced outages into account, daily peak loads are met except on one day in ten years. Differences between the reserve calculated by the present method and the former method were said to be small.

Surplus

The Applicant's estimates of generating capacity, demand, reserve and surplus at the time of the annual peak load are summarized in Appendix 3. The peak demand and the minimum surplus coincide in December of each water year (1 October to 30 September) except in 1983-84. In that year, the first 900 MW of capacity at Revelstoke are due to come in service in December 1983 and, consequently, the minimum surplus of capacity in 1983-84 is forecast by the Applicant to occur in November 1983.

The minimum surplus of capacity after allowing for reserves in each water year under dependable flow conditions was estimated as follows:

Month:	December	December	December	December	November
Water Year:	1979-80	1980-81	1981-82	1982-83	1983-84
Megawatts:	1 158	2 065	1 605	1 095	935

The Applicant's estimates of annual energy capability, loads and surplus are summarized in Appendix 4 for dependable streamflow conditions and in Appendix 5 for average streamflow conditions.

B.C. Hydro has considerable perennial water storage, mainly in the Williston Lake and Mica reservoirs, so it employs a five year period in estimating its streamflow conditions rather than a single year. Of the 35-year period from 1940 to 1975 used for streamflow estimates, the critical period of minimum, or dependable, flows was from October 1940 to September 1945. Average flow conditions were calculated using the average of all the 35 years. In all cases, the storages were assumed to be operated in accordance with B.C. Hydro's normal practices.

The principal operating objectives are to optimize the storage of water and to minimize the use of the Burrard thermal station.

The annual energy surpluses derived in Appendices 4 and 5 are as follows:

	<u>1979-80</u>	<u>1980-81</u>	<u>1981-82</u>	<u>1982-83</u>	<u>1983-84</u>
	(gigawatt hours per water year)				
Dependable flows:	5 651	5 774	5 651	4 290	2 149
Average flows:	7 892	10 683	8 863	7 718	7 842

These energy surpluses include 5 125 GW.h of output from the Burrard thermal station which is assumed to be operated at 65 per cent capacity factor burning natural gas. Excluded is the small contribution of the minor thermal units which are assumed to supply capacity only. Testimony indicated that the assured capability of Burrard was presently limited to 2 700 GW.h per year by constraints on the gas delivery system.

Under the highest streamflow conditions, an annual surplus of up to 10 000 GW.h of hydroelectric energy is forecast by the Applicant.

The policy witness said that Burrard would be used only in emergencies until such time as a permanent operating permit for its use is issued by the Environmental Protection Branch of the B.C. government.

Offers to Canadian Utilities

Evidence was given that, when B.C. Hydro has surplus power or energy available for export, it is offered for sale first to interconnected Canadian utilities on the same terms and conditions as proposed for export.

B.C. Hydro has an agreement with Cominco to meet the load growth in Cominco's West Kootenay service area which Cominco is unable to supply. The prices to be charged for the supply in future are under negotiation.

At present, transactions with Calgary Power are limited by the capacity of the existing 138 kV interconnection, which has a maximum capability of less than 100 MW. Under an agreement between B.C. Hydro and Calgary Power, a 500 kV interconnection will be constructed with a probable in-service date during 1983. When this line is available, B.C. Hydro anticipates the two utilities will be able to provide extensive mutual support and will have the opportunity to sell or exchange large quantities of power and energy.

By letter agreement dated 11 July 1978 with Washington Water Power, B.C. Hydro plans to supply up to 2 279 GW.h of energy between 1 September 1978 and 30 June 1984 at prices which are fixed until 30 August 1983. Documentary evidence shows that this block of energy was offered in 1978 to Cominco and Calgary Power, and was refused by them. Testimony was given by the policy witness that B.C. Hydro regards this export as a sale of strictly interruptible energy, and he gave assurance that, if it could not be supplied from hydro surplus, no deficiency would be

made up by thermal generation. B.C. Hydro is not committed to delivering the entire contract amount but need only make its best effort to do so.

Export Markets

The export markets were stated to be in California and the states of the Pacific Northwest.

Export markets are opportunity markets. The electricity supply situation in the United States was stated to be increasingly precarious owing to rising demand and limited construction of new generation facilities in California and other western states.

Stream flow conditions do not always coincide in domestic and export markets. Thus, under conditions of high stream flows in British Columbia and lower stream flows in the Pacific Northwest, B.C. Hydro has good opportunity to make profitable exports. If high stream flow conditions are experienced in the United States, such that Bonneville has a large surplus, B.C. Hydro may be prevented from exporting to the United States market.

Despite the increasing market opportunities, testimony was given that the ability of B.C. Hydro to sell into these markets is likely to be limited by tie line capacity. It was stated that there is at present no firm plan to construct new international tie lines to British Columbia.

The process of offering surplus power in the export markets and the subsequent negotiation of contracts was described.

The policy witness stated that B.C. Hydro has been approached by several U.S. industrial companies seeking direct service, but that no contracts have been arranged. Evidence was given that a number of large U.S. industrial companies which have supply contracts with Bonneville may be unable to renew their agreements due to a lack of power.

Testimony was given that B.C. Hydro seeks a short-term firm power licence in order to be able to meet market opportunities which may arise in the rapidly changing United States market. Opportunities may arise to export power only. No definite estimate could be made of the likely duration of short-term firm contracts which might be negotiated but the Applicant sought a duration of at least one year to provide for maximum flexibility in accommodating expected opportunities. The policy witness also testified that B.C. Hydro would curtail firm export loads before curtailing firm domestic loads.

Loop Power Flows

Evidence was given that there is a major transmission loop between Blaine and Boundary and a minor loop around Waneta, Boundary and Nelway which give rise to unscheduled loop power flows between Canada and the United States.

Loop flows of energy were estimated during the period of the licences applied for to range from a high of 1 810 GW.h in 1979-80 to a low of 772 GW.h in 1980-81. The amount of these flows varies as facilities and loads are added to the system and the large drop between 1979-80 and 1980-81 was attributed to the Seven Mile project coming into service.

Derivation of Requested Licence Limits

Under the first licence requested, B.C. Hydro would supply firm power to Puget for distribution in the Point Roberts area of the United States. The requested maximum exports of 7 MW and 32 GW.h during any year were stated to amount to about 0.05 per cent of the capability of B.C. Hydro. The Applicant asked that this load be regarded as a border accommodation and treated similarly to its Canadian customers. It was stated that this small amount of firm power is surplus to foreseeable Canadian requirements.

The second licence requested is for the loop power flows described above which involve no net export of electricity except for losses, so that no question arises as to whether this

power is surplus. The estimation of quantities for circulating power is a complex matter but the evidence described the origins of this power and showed that the exported quantities of these flows had been calculated in considerable detail. A maximum licence limit of 2 000 GW.h per year was requested.

The third request is for a licence to export short-term firm power and energy. There have been no such exports since 1973. In this application, a licence is sought for up to 3 000 GW.h per year of short-term firm power. The requested limit was derived from a combination of possible sales of firm power, with the energy being returnable at a later date, and firm energy delivered over a certain period. For example a sale of 600 MW of power might be made for six months at 40 per cent load factor giving an export of about 1 000 GW.h of returnable energy which combined with the export of dependable surplus of up to 1 800 GW.h of firm hydro energy under low stream flow conditions shown in the load forecast would approach the proposed limit. Under good snowpack conditions, more than 3 000 GW.h of firm hydro surplus might be available for export within a water year.

The fourth licence requested is for the export of up to 10 000 GW.h per year of interruptible energy, less any energy exported under the short-term firm power licence. The hydroelectric surplus was estimated to vary from zero to 10 000 GW.h during the requested licence period. Since future stream flows and the actual annual surplus are quite unpredictable, the Applicant requested that the licence limits not be shaped to reflect any forecast of surplus. B.C. Hydro asked that the entire requested quantity of 10 000 GW.h should be licensed, given that sufficient safeguards could be included in the licence conditions to ensure that Canadian priorities are protected.

The policy witness for the Applicant stated that the utility had no objection to the conditions attached to the existing licences being continued in the new licences.

He also testified that B.C. Hydro would not enter into any new export agreements which might require the supply of thermal energy until such time as a permanent operating permit was issued by the B.C. Government. However, it was requested that the licences not be conditioned to deny exports from Burrard because in this event, B.C. Hydro's operations would be unduly constrained.

Export Prices

Evidence was given that export market prices for interruptible energy had risen from 18 mills per kW.h (in U.S. funds) in the winter of 1977-78 to 20 mills in the winter of 1978-79 and to 45 mills when exports were curtailed at the end of November 1979. Continuing increases in U.S. market prices are forecast. Prices which might be realized by B.C. Hydro are also expected to rise, except that sharp set-backs in price may occur if water conditions or tie line loadings in the U.S. prevent B.C. Hydro from gaining access to these markets.

Witnesses for the Applicant stated that the average price of 15 mills per kW.h defined in the contract with Washington Water Power was reasonable at the time it was negotiated in 1978. B.C. Hydro entered into the contract with Alcan to purchase 1 200 GW.h per year at 7 mills per kW.h, contingent upon its being able to secure export licences. The Applicant stated that, in its view, the selling price of 15 mills for approximately half the energy to be purchased from Alcan at 7 mills was justified. Any sales to Washington Water Power in excess of the quantities specified in the contract would be priced at the current market rate.

B.C. Hydro asked that its licences not be conditioned with a minimum floor price for exports. Although it could normally control its storage to avoid selling below the purchase price paid to Alcan, circumstances could arise in which the

market would require lower prices. The Applicant stated that it sought the freedom to sell at prices down to its incremental cost of production if necessary because the alternative of spilling is bound to result in unnecessarily lost revenue.

It was stated that sales to Point Roberts are made at the same rate for power and energy as is charged to comparable Canadian customers plus a surcharge overall of ten per cent.

System Performance

Load flow diagrams and associated computer print-out sheets were provided as part of the application, showing the results of load flow tests on the system under selected loading conditions in each year of the requested licence period.

Environmental Considerations

The Applicant stated that there would be no incremental environmental effects in its hydroelectric system on account of exports.

There would be a small incremental environmental effect if the Burrard thermal plant were used for exports. The status of this plant is that it may at present be operated in emergencies under a letter of permission from the Pollution Control Branch, B.C. Ministry of Environment. Tests are planned to investigate the environmental effects of Burrard operations following which B.C. Hydro anticipates a permanent environmental permit may be issued. The policy witness for the Applicant stated that no new export contracts would be negotiated which would require the operation of Burrard until such time as the permit is obtained. Pending receipt of a permit, the station would be operated only in emergencies. Evidence was given that it is not good operating practice to fire up and shut down the Burrard station frequently and, therefore, if an emergency requiring its use arises, it is likely to be kept in service for some days. When B.C. Hydro is forced to keep Burrard on line for these operational reasons it would like to be able to export electricity generated there.

SUBMISSIONS AND INTERVENTIONS

Written submissions relative to the application were received from approximately 50 individuals and organizations.

Twenty-five individuals and groups intervened at the hearing, of whom three adduced direct evidence in support of their interventions.

What follows is a resumé of each intervention and a summary of other submissions.

Attorney-General of the Province of British Columbia

The Attorney-General supported the application and submitted that the quantities of power proposed for export do not exceed anticipated surpluses after due allowances have been made for the reasonably foreseeable requirements of consumers in British Columbia. It was argued that revenue realized from export sales would benefit provincial consumers and that the application should, therefore, be granted.

In argument on the preliminary issue of construction or operation for export, the intervenor stated that the British Columbia government policy directive to B.C. Hydro requires the utility to construct its system to meet domestic loads. Because the British Columbia Government had approved the construction of Revelstoke and other projects, it could be inferred that B.C. Hydro has not constructed and is not constructing projects for the purpose of making exports.

In final argument, it was stated that the application of B.C. Hydro represents no departure from the established policies in regard to export. It is clear that there will be a surplus of power and energy resulting from normal operations. The prices which can be realized by exporting this surplus will be just and reasonable in the public interest. The Attorney-General urged that the licences should, therefore, be granted as applied for, with the proviso that the short term firm licence should be conditioned to protect the interests of B.C. consumers.

British Columbia Institute of Agrologists

The Institute expressed concern about the proposed development by B.C. Hydro of Site C on the Peace River.

British Columbia New Democratic Party Caucus

In a written submission the NDP expressed concern that B.C. Hydro might expand its operations to take advantage of future export opportunities if it were granted the licences applied for on this occasion. The NDP contended that B.C. Hydro has no mandate from the people of British Columbia to construct facilities for export. The NDP is in favour of the export of incidental surpluses as long as the price obtained is fair and reasonable.

The NDP submitted that the evidence of over-expansion of the B.C. Hydro system is provided by the amount of capacity reserve, which it stated to be excessive.

In regard to price, the NDP submitted that export authority should not be granted without contracts stating clearly the price to be charged for export power. The NDP asserted that surplus hydro should be priced to recover capital costs of new generation and transmission facilities, indirect costs borne by government, revenues foregone by displacement of industrial activity and social and environmental costs. Export prices should not be lower than B.C. residential rates.

B.C. Wildlife Federation

In its submission, the Federation argued that B.C. Hydro has a surplus of power to export because it has been building excessively ahead of need.

The submission asserted that there is no provincial energy policy which reflects consideration of whether the issue of licences would be in the interest of British Columbia citizens. Concern was expressed that licencing in these circumstances may lead to a commitment to a continental energy policy.

The Federation objected to the short notice provided of the hearing date.

Canadian Scientific Pollution and Environmental Control Society

SPEC stated its opposition in principle to the licensing of firm power exports because B.C. Hydro has no mandate in this respect. Concern was expressed that firm export licences would promote a policy of planning excessive generation and result in environmental damage.

SPEC has no objection to the export of surplus interruptible hydroelectric energy provided the generation facility was built to serve domestic need and the price is fair.

SPEC opposed the use of Burrard for export.

The Society asked that additional time be made available for it to investigate the various shortcomings which it perceived in B.C. Hydro's application.

In final argument, SPEC urged the Board to be wary of inaccuracies likely to be found in forecasts made by B.C. Hydro.

SPEC expressed strong opposition to the granting of any licences for firm exports and, because of the rapid changes now being seen in the energy area, recommended that any licences should be limited to a term of three years. SPEC asked the Board to require a complete environmental impact assessment to be made in respect of Burrard before it could be used to generate power for export.

City of Port Moody, Environmental Protection Committee

The City of Port Moody expressed concern at possible damage to the environmentally sensitive Burrard basin stemming from atmospheric emissions of the Burrard plant.

Cominco Limited

Cominco presented an intervention in which it proposed a licence condition in respect of any short-term firm licence which the Board might issue. The proposal is to remove the restriction in the existing licence that B.C. Hydro limit its export commitment to 65 per cent of the forecast energy surplus and substitute a condition requiring a clause in export contracts stating that firm exports would be curtailed before any firm Canadian loads.

Communist Party of Canada

The Communist Party intervened to state that the quantities of power and energy for which B.C. Hydro is requesting export licences do not represent a modification of the existing licences but rather a new policy referred to as a "continental energy policy".

The Communist Party urged the Board to deny the application.

Council for Yukon Indians

The objective of the Council for Yukon Indians is to represent all status and non-status Indian people with ancestral rights in the Yukon Territory. The Council for Yukon Indians sought to introduce evidence regarding the proposed Liard River project of B.C. Hydro, but this evidence was held by the Board to concern matters beyond its jurisdiction since any such projects would not be placed in service in the requested licence period.

Council of Forest Industries of British Columbia

The Council of Forest Industries expressed concern about the security of electricity supply for its members.

The Federation of British Columbia Naturalists

The Federation is an organization of 3 900 members in 35 clubs concerned with the study and preservation of nature throughout B.C.

In a written submission, the Federation stated that B.C. Hydro had not provided sufficient data to allow calculation of the dependable energy surplus available during the licence period and had failed to submit calculations of energy costs.

In argument, the Federation submitted that the price of all exports of electric power should include some allowance for fixed costs and social and environmental costs. Burrard should not be used except in an emergency.

It was submitted that B.C. Hydro data indicated there is a very small surplus, if any, and it would be unwise to commit

that surplus for export because it might engender dependance of the American customers upon Canadian supply. The Federation expressed no objection to a licence which might be issued for the export of interruptible electric energy, but is opposed to any licence for short term firm power.

Greenpeace Okanagan

Greenpeace submitted that the hearing should be delayed until March 1980.

Ms. C. Hartwig

Ms. Hartwig wrote to express concern with the policies of B.C. Hydro, particularly in respect of future developments on the Peace River. She opposed firm exports and urged that B.C. Hydro's application be denied.

Ladner Environmental Office

Ladner stated that it represents associated persons who are residents of Delta, B.C. In its intervention, Ladner stated its concern with planning policies adopted by B.C. Hydro and asserted that potential negative impacts applicable to resource use must be fully investigated and indemnified.

Ladner argued that the licence limits proposed by B.C. Hydro in its application were too high relative to the likely surplus. It further argued that the prices to be charged in the contract for supply to Washington Water Power Company were too low and should be renegotiated to satisfy the Board's third price test. All surplus interruptible energy should be offered routinely to potential Canadian customers on a formal basis before it was offered for export.

If B.C. Hydro continued to plan as it testified it would, solely to meet domestic demands, there should be no capacity surplus in future and thus no justification for a short-term firm licence. Ladner did not object to the issuing of a licence for the export of surplus interruptible energy.

Mr. K. McAllister with Mr. J. Black

Mr. McAllister intervened on his own behalf and with Mr. Black on behalf of the Canada Coalition for Nuclear Responsibility.

Mr. McAllister suggested that alternative renewable energy resources such as geothermal, wind and biomass should be developed and that surplus electricity could be used to electrify railways. He expressed objection to the possible use of nuclear power in British Columbia.

Mr. McAllister questioned whether the policy witness was sufficiently qualified to give evidence with respect to policy and he requested the Board to compel the attendance of the Chairman of B.C. Hydro for cross-examination.

Mr. Black calculated that the total cost of generation from B.C. Hydro's newest plants was about 75 mills per kW.h. In his opinion any export sales should include all costs including environmental costs, transmission losses and other expenses based upon full recovery of the costs associated with the newest plant in the system.

Mr. Black argued that precipitation in 1940-45 was average, and not critical, and he questioned the validity of B.C. Hydro having adopted that time span in its calculation of the critical flow period.

In final argument, Mr. Black submitted that, if B.C. Hydro could not recover from exports the applicable portion of the total costs of its newest generation facilities, then it was evident that the utility had overbuilt relative to domestic requirements.

Municipal Council of Hudson's Hope

In its submission, the Council expressed no opposition to the export of surplus power provided no new project commitments are made explicitly for export purposes. The Council urged that surplus hydroelectric power be recognized as a major export commodity and that the region which generates the power should enjoy ongoing benefits beyond those associated with initial construction.

Peace Valley Environmental Association

The Peace Valley Environmental Association sought to intervene to oppose the construction of further hydroelectric dams on the Peace River.

The Sierra Club of Western Canada

The Sierra Club intervened jointly with the Canadian Scientific Pollution and Environmental Control Society in the first phase of the hearing held 11 and 12 December 1979 and separately following the resumption of the hearing 22 January 1980.

The Club is a society devoted to the conservation of natural resources.

The Club introduced as evidence data regarding the effects of nitrogenous air pollutants and related this information to operation of the Burrard thermal station. The Club stated its objections to any thermal generation for export, because damages resulting from the generation would be inadequately compensated by revenues received and also on conservation grounds.

In final argument, the Club asserted that there should be no firm exports, but that if the Board authorized firm sales, then full capital costs must be recovered and export contracts should be for a term not exceeding one year. All proposed short-term firm power export contracts should be made available for public discussion for at least sixty days before the Board approves or disapproves them.

The Club expressed no objection to the issue of interruptible licences for the export of surplus interruptible energy and stated that perhaps the limit should be higher than the requested 10 000 GW.h per year to maximize the revenue potential. In view of forecasting uncertainties, the term of any licences should be limited to three years.

Skeena Protection Coalition

The evidence showed that B.C. Hydro had in 1978 constructed a 500 kV transmission line between Telkwa and Skeena in British Columbia. The construction of this line connected the previously isolated Skeena district, which had been served by generation from Alcan, into the integrated B.C. Hydro system.

B.C. Hydro stated that the line was needed to meet the peak in the Skeena area and that as part of their normal system expansion, they would expect to twin this line at some future date.

Pointing to the agreement of 11 July 1978 between B.C. Hydro and Alcan, Skeena argued that the 500 kV power line had been constructed for the purpose of making an export and that its costs should, therefore, be introduced as evidence at this hearing and be included in the price of any power which B.C. Hydro might be authorized to export.

B.C. Hydro argued that any exports would be made from the entire B.C. Hydro system, of which the new power line is an integral component. B.C. Hydro stated that at least part of the energy is required for domestic purposes, that it would not be wheeling power for export on behalf of Alcan and that, therefore, the costs of the power line are not relevant.

Skeena presented one witness who is Chief of the Water Use Unit of the Department of Fisheries.

Evidence was given in respect of the Alcan hydroelectric facility located on the Kemano River in northern British Columbia. It was established that, when Alcan generates electricity, the water discharged from the turbines flows westwards down the Kemano River into the Pacific. If Alcan spills water, it discharges into the Nechako River which flows eastwards into the Fraser River.

The particular concern of the Coalition is the spawning and hatching of Chinook salmon in the Nechako River. A balance

of flows at various seasons is required to ensure that the salmon nests or "redds" do not become dehydrated, frozen or swept away.

The state of the redds can be estimated by observing water flows during the winter, but can only be established with certainty during a brief period between the breakup of winter ice and the onset of the high spring water flows. The witness testified that there is a five-year lag between damage occurring to the redds and the positive measurement of the extent of this damage by means of the fish count.

Evidence shows that fish counts have varied from about 7 000 to 1 000 in the 20 years preceding construction of the Kemano project in 1960. This variation was attributed to naturally occurring variations in water level. Subsequent evidence shows that the construction of dams on a river can result in improved conditions for fish resulting from the opportunity to regulate water flows.

For the three years 1960 to 1963 following construction of the Alcan project, the fish count in the Nechako River was zero as river flows were cut off to fill the reservoir behind the new dam. From 1963 to 1978 the fish count steadily rose each year to 7 000 in 1978. This improvement was attributed to successful water management in the Nechako River as a result of discussions between Alcan, the Department of Fisheries, the B.C. Water Comptroller and public interest groups.

The Coalition stated that water flows in the Nechako River had been severely restricted during the winter of 1979-80 and it was expected that severe damage would occur to the redds. The Coalition claimed that this reduced flow was due to increased generation by Alcan, necessitated by its contract dated 11 July 1978 in which it would supply 1 200 GW.h per annum to B.C. Hydro. Actual deliveries by Alcan to B.C. Hydro in 1979 were higher than 1 200 GW.h. The Coalition stated that requests to

Alcan to release more water to the river had been rebuffed.

The witness for Skeena estimated that a reduction in the fish count by an amount of 7 160 fish equated to a cost to fishermen of \$100 000 per annum.

In final argument, Skeena stated that clearly there are costs to British Columbia due to fewer fish in the Nechako River as a result of power generated by Alcan for export by B.C. Hydro. Skeena argued that these costs should be considered as part of the costs of exporting power. Losses also occur because of the reduced value of recreation and sport fishing.

Texada Environmental Association

At the re-opening of the hearing on 22 January 1980, a representative of Texada requested permission to make sound and videotape recordings of the entire proceedings. The Board stated that as a matter of policy, it has not permitted the taping of its proceedings in the past and it was not prepared to depart from that practice at this hearing. Texada withdrew its equipment.

Union of British Columbia Indian Chiefs

The Union of British Columbia Indian Chiefs stated that B.C. Hydro was requesting to more than double its current level of exports. It inferred that this represented a new policy which would require increased power facilities. It asserted that Indian people have had to pay the costs of such developments without gaining any substantial benefits from them.

United Fishermen and Allied Workers' Union

The Union represents the interests of its members who are citizens of Canada residing in British Columbia. In a pre-hearing letter, the Fishermen stressed their concern to maintain in perpetuity the fishery which they define as a renewable resource.

In argument, the Fishermen asserted that B.C. Hydro had a poor record for accuracy of forecasting loads and presented its own calculation to show that Revelstoke will not be needed during the licence period. The surplus of water forecast to occur in some years could and should be stored in the Williston Lake reservoir for use in years of lower flow.

The Fishermen are opposed to any building of facilities for export, but if any are built the cost should be fully recovered in the export price.

A short-term firm licence should not be issued, as it could result in U.S. dependence upon Canadian plants and could lead B.C. Hydro to over-construct.

Greater efforts should be made by B.C. Hydro to store water in years of surplus to minimize the likelihood of using Burrard.

The Union asked that, in future, more time be allowed to intervenors to prepare their submissions, that direct financial assistance be given to intervenors and that intervenor's access to transcripts be improved.

The Union argued that it had been sufficiently demonstrated that the generation of power by Alcan for export had reduced water flows in the Nechako River with resultant damage to the fishery. While the Union is entirely opposed to the destruction of fish it also asserted that export prices must fully recover any costs to the fishery. Because it advocated that optimum flows should be maintained in the Nechako River, the Union strongly opposed the application for both firm and interruptible licences.

Westcoast Transmission Company Limited

Westcoast submitted in argument that B.C. Hydro should be required to curtail exports of power before curtailing Canadian customers for the same class of power or energy.

Other Submissions

About twenty-five letters and submissions in respect of the application were received from individuals and groups who did not appear at the hearing.

The general views expressed were that hearings should be delayed pending resolution of B.C. energy policy issues and that no licences should be issued for firm power exports.

DISPOSITION OF THE MATTER OF CONSTRUCTION AND OPERATION FOR
EXPORT

In its decision of 12 December 1979 on the questions raised by Notices of Motion for Adjournment, the Board stated that it would hear evidence to establish whether the generating system of B.C. Hydro had been constructed, or was being constructed, or would be operated in a different manner to meet export sales as opposed to domestic load.

Following the adjournment, the Board heard evidence commencing 22 January 1980. It then heard preliminary argument on the matter of construction and operation for export.

The Board rendered its decision on the matter of construction and operation for export on 29 January 1980. The full text of the decision is contained in Appendix 7.

In summary, the Board concluded that B.C. Hydro has not constructed, is not constructing, and is not operating its system in a different manner to meet export sales as opposed to domestic load.

DISPOSITION OF PART A

Section 83 of the NEB Act sets forth the considerations applicable to the issue of export licences. Three of these are: that the Board shall satisfy itself that the power to be exported is surplus to reasonably foreseeable Canadian requirements; that the Board shall satisfy itself that the price to be charged for the exported power is just and reasonable in relation to the public interest; and that the Board, in dealing with the export application, shall have regard to all considerations that appear to it to be relevant.

Surplus

In arriving at its disposition of this application, the Board has relied upon "additional information" supplied by the Applicant to supplement the information contained in its application of 16 May 1979. This information was supplied to the Board and to intervenors prior to the hearing. It represents the Applicant's September 1979 forecast of power and energy demand, supply and surplus during the requested licence period. While the additional information had not been approved by the B.C. Hydro Board of Directors at the time of the hearing, the testimony shows that it does represent the best estimates of the Applicant's staff. It forecasts a smaller surplus than that shown in the original application.

The load forecasts show an estimated growth of demand amounting to some $6\frac{1}{2}$ per cent per annum over the period of the licences applied for. Testimony shows that this load growth is comparable to that experienced in the past five years when adjusted for annual fluctuations and for the addition in 1978 of the previously-isolated Skeena load.

The forecasting witness for B.C. Hydro described in considerable detail methods of forecasting used by the utility. The evidence showed that the actual loads experienced in Canada in the past five years fell below the demand forecast made some

years earlier, but that, at present, demand forecasts made some years ago and actual demands are in reasonable accord. In looking ahead, it is evident there are many uncertainties which may invalidate forecasts made today. B.C. Hydro stated that the accuracy of its forecasts have compared well with those of other major Canadian utilities in recent years.

The evidence shows that B.C. Hydro has been successful in adjusting its construction program so that the facilities coming into service have closely matched the actual loads placed upon the system, even when these loads were below earlier forecasts. To match current forecasts, Revelstoke, which had been originally scheduled to come into service in 1982, has been deferred until the end of 1983. Also the Hat Creek thermal station, which had been planned for service before 1984, has been postponed until a later date.

The evidence shows that B.C. Hydro acted on one occasion since 1975 to take advantage of an export opportunity. This occurred when the Seven-Mile Project was advanced by four months to come into service in December 1979 instead of April 1980. Testimony was given that this advancement cost \$1 million and an increased export revenue of \$7 million was anticipated. When this unit came on stream, however, it was required to meet domestic requirements owing to difficulties elsewhere in the system, and, therefore, the export opportunity was not realized.

The Board is satisfied that it is an inherent characteristic of electric power systems that there will inevitably be periodic surpluses of capacity because new generating plants can be added only in discrete increments. In addition, the utility must plan to meet the maximum probable load under the worst forecast supply circumstances, so that there is a surplus of capacity and/or energy at all times when these extreme conditions do not prevail. This is particularly true in a system such as that of B.C. Hydro which is predominantly hydroelectric.

The Board accepts the Applicant's contention that the denial of licences to export surplus power would decrease revenues and increase the cost of power to domestic consumers with no offsetting benefit.

Several intervenors expressed concern that the construction of generating facilities causes damage to the environment and they questioned the policies adopted by B.C. Hydro in planning to meet the domestic demand. As stated in the Board's decision on the applications for adjournment, set down in full in Appendix 6, these matters are beyond the purview of the Board and are under provincial jurisdiction. The Board's responsibility in this area is to ensure that the power to be exported is surplus to domestic requirements and any licences which the Board might issue would be conditioned to discharge that responsibility.

Several intervenors expressed concern that export sales, particularly of firm power, might lead to an eventual commitment to continue supplying United States requirements beyond the term of any contracts which might be negotiated. However, the evidence shows that interruptible exports have been interrupted frequently. Short-term purchases can be used only to cover capacity shortages of a temporary nature. The amounts of energy available for short-term firm exports will vary from year to year and cannot be contracted for periods long enough to influence generation planning. The Board is satisfied that transfers of power and energy of this type between utilities are not likely to result in obligations beyond those specified in the contracts covering a particular sale.

The ties which B.C. Hydro has, or plans to have, with neighbouring utilities provide a backup in times of emergency and permit economical transfers of power to be made at any time. The evidence shows that the existence of emergency backup permits

lower reserves on the B.C. Hydro system with a resultant saving of capital expenditure. In addition, revenues from export sales result in lower domestic energy prices.

One intervenor argued that no export licences should be granted and that B.C. Hydro should be required to store all surplus water for use at a later time. The evidence shows that this mode of operation is not feasible and that in a predominantly hydro system, designed to meet domestic loads, there are inevitably some surpluses available from time to time. If these surpluses are not exported they must usually be spilled with consequent loss of revenue.

Several intervenors recommended that if any licences were issued, their term should be limited to three years or shorter. In approving a term for a licence, the Board seeks to strike a balance. A licence term shorter than five years leads to an almost continuous process of applications and hearings. The Board is satisfied that, in the circumstances pertaining to B.C. Hydro, licences can be conditioned satisfactorily to accommodate changes in circumstances which are likely to occur during a five-year time span.

Price

Several intervenors expressed concern that B.C. Hydro exports some electricity at prices below domestic residential rates. It must be recognized that domestic residential customers are receiving a firm supply and that their rates include the costs of the distribution system and various retail expenses such as billing, meter reading, etc. By contrast, export sales are made in bulk and, since 1973, have consisted of interruptible supplies.

Several intervenors felt that interruptible exports should bear some of the capital costs of facilities and some of the environmental and social costs attributable to the total B.C. Hydro system, even though the system was shown to have been

constructed solely for domestic purposes. Normal utility practice is to include in interruptible energy costs only those costs directly incurred in supplying the incremental energy. These costs in the case of hydroelectric generation include the B.C. water licence fee per kilowatt-hour generated plus incremental operating and maintenance expenses. The Board is satisfied that sales made at prices exceeding one mill per kW.h would in fact recover the incremental costs of generating interruptible exports. However, it was noted that export prices have been rising rapidly from 18 mills per kW.h in the winter of 1977-78 to 45 mills in November 1979, so that in practice there is a very large margin of price over incremental cost.

The Skeena Protection Coalition attempted to establish that the new 500 kV power line from Telkwa to Skeena had been built for the purposes of making an export and that its costs should, therefore, be examined and included in the price of exported energy. B.C. Hydro countered that this power line was constructed for domestic purposes to integrate the Skeena area into the main B.C. Hydro system because Alcan can no longer provide an assured supply to the area. B.C. Hydro stated that exports were made from the entire B.C. Hydro system and that the Alcan power was not being purchased or wheeled specifically for export. The Board is satisfied that the contract between Alcan and B.C. Hydro does not lead to the conclusion that the Telkwa to Skeena power line was built for the purpose of making an export and, therefore, its costs are considered not to be relevant in this application.

The Skeena Protection Coalition sought to establish that, as a result of the contract between Alcan and B.C. Hydro, water flows in the Nechako River had been severely curtailed during the winter of 1979-80 with resultant severe damage to the fishery - specifically the dehydration of Chinook salmon redds. The Coalition argued that the Board should require Alcan to

maintain certain flows in the Nechako River to minimize any damage to the fisheries in future. Alternatively, the Coalition argued that if damage does occur to the fishery, then the cost of this damage should be calculated and included in the price of any power which might be exported. B.C. Hydro said that it has no control over the operations of Alcan and assumed that Alcan would operate according to any restrictions or conditions imposed in its water licence granted by the province.

The evidence shows that damage to redds can be estimated only during a brief period in the spring between ice breakup and the onset of high stream flows and that these estimates can only be confirmed some five years later when fish counts are made. It would, therefore, appear to be infeasible to quantify at this time the amount of any damage which may occur. In respect of attempting to minimize the amount of damage, the evidence also shows that in the past there has been cooperation between Alcan, the Department of Fisheries, the B.C. Water Comptroller, public interest groups and B.C. Hydro in regard to resource management.

The Board notes that the Exchange Agreement between B.C. Hydro and Alcan calls for the establishment of an Operating Committee and gives considerable flexibility in operating the storages of the two parties. While the Board does not have jurisdiction over the manner in which Alcan operates its hydroelectric facilities, it expects that, in relation to energy deliveries from Alcan that may be exported, B.C. Hydro will give all possible assistance to Alcan to maintain adequate and uniform flows in the Nechako River during the salmon spawning and incubation period. The Board intends to condition any licence to require B.C. Hydro to report the monthly maximum and minimum flows in the Nechako River.

B.C. Hydro has contracted to purchase substantial quantities of energy from Alcan at a price of seven mills per

kW.h, subject to some escalation. It would be expected that B.C. Hydro would not resell energy at a lower price, but testimony showed that circumstances could arise when this would be necessary. Consequently, the Board would condition a licence for interruptible energy exports to require that B.C. Hydro provide an explanation if any sales are contemplated at a lower price than the purchase price paid to Alcan.

To conform with Board policy, sales of thermally generated energy from Burrard must recover the costs of generation calculated on the basis of the export price of natural gas. According to the formula proposed by the Applicant, this would result in a current price for thermal exports from Burrard of approximately 50 mills per kW.h. The Board would condition any licences it might issue to require that the export price of gas be used in calculation of the cost to be recovered for any energy exported from Burrard under normal operating conditions. An exception would be made under emergency conditions when B.C. Hydro would be permitted to apply its gas price formula based upon its cost of gas.

Under normal circumstances, when the Burrard thermal plant is in operation and exports are taking place at the same time, the Board will deem that the net output of the Burrard thermal plant is being exported. An exemption will be made when Burrard has been started up to meet Canadian requirements and has been kept on line solely for operational reasons.

Depending on the storage levels in reservoirs and on anticipated river flow conditions some proportion of hydroelectric energy exports may be replaced by thermal generation. The Board will expect B.C. Hydro to take into account the cost of thermal generation in calculating the minimum price of such exports.

Prices for interruptible energy to be exported under B.C. Hydro's contract with Washington Water Power Company range

from 12.5 to 18.0 mills per kW.h for the balance of the contract. These prices appear low in current markets but the market prices may drop in the future. On balance the prices established in the contract may be considered reasonable for the next few years. In these circumstances the Board is satisfied that it would be inappropriate to interfere with the contract at this time. The Board would condition any licence it might issue for this export to require that the energy be made available to any purchaser in Canada on the same terms as any other interruptible energy offered for export, including the opportunity to purchase it on an hourly basis. The Applicant undertook not to supply thermal energy under this contract. Having regard to all the considerations of price applicable to the export of energy to the Washington Water Power Company, the Board is satisfied that the proposed prices to be charged for this export are just and reasonable in the public interest.

Taking into account all of the considerations discussed above, the Board is satisfied that the prices to be charged for exports of interruptible energy will recover the appropriate costs incurred in Canada. For short-term firm exports, the price charged would normally be higher than the expected price for interruptible energy in the same period because of the necessity to recognize a suitable charge in respect of the capacity committed. Appropriate conditions tailored to each type of power would be imposed.

In order to ensure that the export prices satisfy the second price test, that the export price be not less than the price to Canadians for equivalent service, the Board would continue its policy of imposing conditions in both the short-term firm and interruptible licences requiring that any power to be exported be first offered to all interconnected Canadian utilities on terms not less favourable than those negotiated with the foreign purchaser.

With respect to the requirement that the export price not be materially lower than the least cost alternative to the foreign purchaser, the Applicant testified that its exports are sold in an opportunity market at current market prices. The Board accepts B.C. Hydro's contention that the current market price for such energy will, in general, constitute the least cost alternative available to an export customer. Interruptible exports should therefore satisfy the Board's third test if made at the current market rate.

With respect to the short-term firm licence, the Board would impose a condition to require that any contract for the supply of this type of power be submitted for approval.

One intervenor argued that the newest hydro generating plants built on the B.C. Hydro system would have a cost of 75 mills per kW.h. It was argued that no export sales should take place unless a comparable price could be obtained. If a long-term firm licence were being applied for, the cost of generating facilities would have to be accounted for in the export price, but such is not the case in this instance.

Environmental Considerations

The Applicant requested licences which would permit the export of electricity generated from the burning of natural gas at the Burrard Station. Several intervenors took the position that there should be no exports of thermally-generated power or that such exports should be limited to emergency situations.

At present, the Burrard plant may be operated in emergencies under a letter of permission issued by the Pollution Control Branch of the B.C. Ministry of the Environment and work is proceeding on an application for a permit. The policy witness for the Applicant testified that B.C. Hydro would enter into no new export contracts which would require the utilization of the Burrard plant until a normal operating permit is secured.

In determining whether the prices proposed for exports are just and reasonable, the Board takes into account all incremental costs including environmental and social costs. The United Fishermen and Allied Workers' Union and the City of Port Moody indicated to the Board their concerns regarding the environmental effects and the resulting costs of the operation of Burrard. However, no intervenor was able to identify any specific damage or environmental or social costs attributable to the incremental operation of Burrard when generating power for export.

Having regard to all the evidence, the Board is prepared to issue licences that would permit the operation of Burrard for exports subject to the condition that a permit must be issued by the Provincial Pollution Control Authorities before Burrard may be used for exports in other than emergency circumstances.

Request to Renew With Modifications Licence EL-85

The Point Roberts service area of the Puget Sound Power and Light Company has been served by B.C. Hydro since 1922. This is the only licence applied for in the present application under which firm power would be exported year-round for the entire licence period. The maximum requested licence quantities in fact represent less than 0.1 per cent of the generating capability of B.C. Hydro. The evidence showed that B.C. Hydro treats the supply of this load as being in a similar category to the supply of its Canadian customers, and that the Point Roberts requirements are included in the estimates of the domestic load. The Board is satisfied that this small amount of firm power is surplus to foreseeable Canadian requirements.

The prices proposed by the Applicant are ten per cent above the tariff charged to comparable Canadian customers. The Board is satisfied that the pricing arrangement is just and reasonable.

Intervenors expressed no opposition to firm exports of power and energy to Point Roberts.

The Board is prepared to issue to B.C. Hydro a licence to export firm power to Puget. The suggested terms and conditions of the licence are set out in Appendix 8-A. The licence would run from 1 April 1980 to 30 September 1984.

Request to Renew with Modifications Licences EL-87

In regard to circulating energy, the Board is satisfied that no net export of energy occurs since quantities exported are simultaneously imported, except for some small discrepancies due to metering errors and losses and, therefore, the question of surplus does not arise. There is no transfer of money and, therefore, the question of price does not arise.

Circulating flows of power are an inherent characteristic of any power system in which there are transmission loops. The amount and direction of these flows varies with load and generation and the characteristics of the system change when new facilities are added. The data supplied by the Applicant were examined by the Board's staff to ensure that the proposed exports and international loop flows would not adversely affect the reliability of supply to Canadian customers.

It is necessary that such exports and imports be recorded and accounted for. In light of the evidence presented, the requested licence limit of 2 000 GW.h per year seems reasonable.

Accordingly, the Board is prepared to issue to B.C. Hydro a licence to make inter-utility carrier transfers of unscheduled circulating exchange of inadvertent power and energy for simultaneous return to Canada. The suggested terms and conditions of the licence are set out in Appendix 8-B. The licence would run from 1 April 1980 to 30 September 1984.

Request to Renew with Modifications Licence EL-88

B.C. Hydro has not made short-term firm power exports since 1973. However, the Applicant stated that a new licence is sought for this class of power because it is anticipated that attractive market opportunities may arise to sell power only or power and energy.

The evidence shows that, under low stream flow conditions, B.C. Hydro may not have a surplus capacity of 2 000 MW nor 3 000 GW.h per year from hydroelectric generation. The evidence also shows that there are considerable uncertainties in forecasting both demand and supply. The Applicant testified that export commitments based on using Burrard would not be made at present but might be entered into later during the licence period when complete operating permits have been secured. In these circumstances, the Board is prepared to grant a short-term firm licence to enable B.C. Hydro to dispose of its surplus capacity and energy on the best terms it can secure, but the licence would be conditioned to protect anticipated Canadian priorities.

The existing short-term firm power licence EL-88 is conditioned to limit export commitments to 65 per cent of the forecast energy surplus in the coming water year. Cominco proposed that this limit should be replaced by a condition that would allow B.C. Hydro to commit its entire energy surplus subject to an undertaking to curtail export loads before curtailing Canadian firm loads.

In considering this proposal the Board found that there is a wide range of Canadian firm loads and that the requirement to curtail exports to meet these demands would undermine the essential contractual basis of a firm licence. B.C. Hydro stated it had no objection to any of the existing licence conditions and it did not make any statement in support of the change proposed by Cominco. The policy witness for B.C. Hydro did indicate that reasonable priority is given to meeting Canadian demands. Any

surplus in excess of 65 per cent of the forecast energy surplus could of course be exported as interruptible energy. In these circumstances the Board would retain the present licence condition in any short-term firm licence it might issue.

Considering the uncertainties inherent in forecasts made for hydroelectric systems, the Board would impose a time limit that short-term firm contracts should be limited in term to 12 months from the date of their execution.

The price to be charged for any short term firm power exports would normally include a demand charge and therefore be greater than the price of interruptible energy exports. The appropriate magnitude of the demand charge would depend upon the duration, load factor and other terms of any contract which might be negotiated. Therefore, the Board would condition the short-term firm licence to require that export contracts which may be negotiated be submitted for the approval of the Board prior to commitment.

The Board is prepared to issue to B.C. Hydro, a licence to export short-term firm power and energy in amounts up to 2 000 MW and 3 000 GW.h per year.

The suggested terms and conditions of the licence are set out in Appendix 8-C. The licence would run from 1 April 1980 to 30 September 1984.

Request to Renew With Modifications Licence EL-89

B.C. Hydro applied for the replacement of its existing export licence EL-89 for interruptible energy with the modification that the quantity be increased to 10 000 GW.h per year from 7 000 GW.h, less any net amount exported as short-term firm power.

The evidence shows that, under the highest flow conditions, the total of surplus hydroelectric energy may amount to 10 000 GW.h. At the other extreme there may be no surplus available for export.

The evidence shows that constraints on the gas delivery system might limit the output of Burrard to 2 700 GW.h and that, in any event, no new export contracts requiring the use of Burrard would be entered into until such time as a permit is obtained from the Pollution Control Branch.

The only contract which B.C. Hydro has for the export of interruptible energy is with Washington Water Power. The Board is satisfied that this energy is interruptible and that there is no obligation upon B.C. Hydro to supply the contracted amount unless it can be supplied from hydro surpluses before 30 June 1984. For the reasons given above, the Board is satisfied that the price is just and reasonable and in the public interest.

The Board is prepared to issue a separate licence for the export of interruptible energy to Washington Water Power. This will permit the inclusion of special conditions which the Board considers appropriate to this licence and will assist accounting for quantities and prices of exports. The suggested terms and conditions are set out in Appendix 8-D. This licence would run from 1 April 1980 to 30 June 1984.

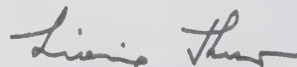
The Board is prepared to issue a fifth licence for the export of interruptible energy with a maximum quantity of 10 000 GW.h per year less the amount of any net short-term firm power exports and less the amount shipped to Washington Water Power under the fourth licence. The Board will condition the interruptible licence to require the approval of the Board prior to entering into any agreements to sell interruptible energy on other than an hourly basis. The suggested terms and conditions of the licence are set out in Appendix 8-E. This licence would commence 1 April 1980 and expire 30 September 1984.

Recapitulation

Having regard to all considerations that appear to it to be relevant, the Board is prepared to grant the application subject to the conditions previously stated.

Although the application for licences is in four parts, it would be preferable to issue five licences so that the interruptible energy exports to the Washington Water Power Company can be authorized separately instead of being combined with the other interruptible energy exports.


The conditions applicable to the five licences are set out in Appendices 8-A to 8-E inclusive.



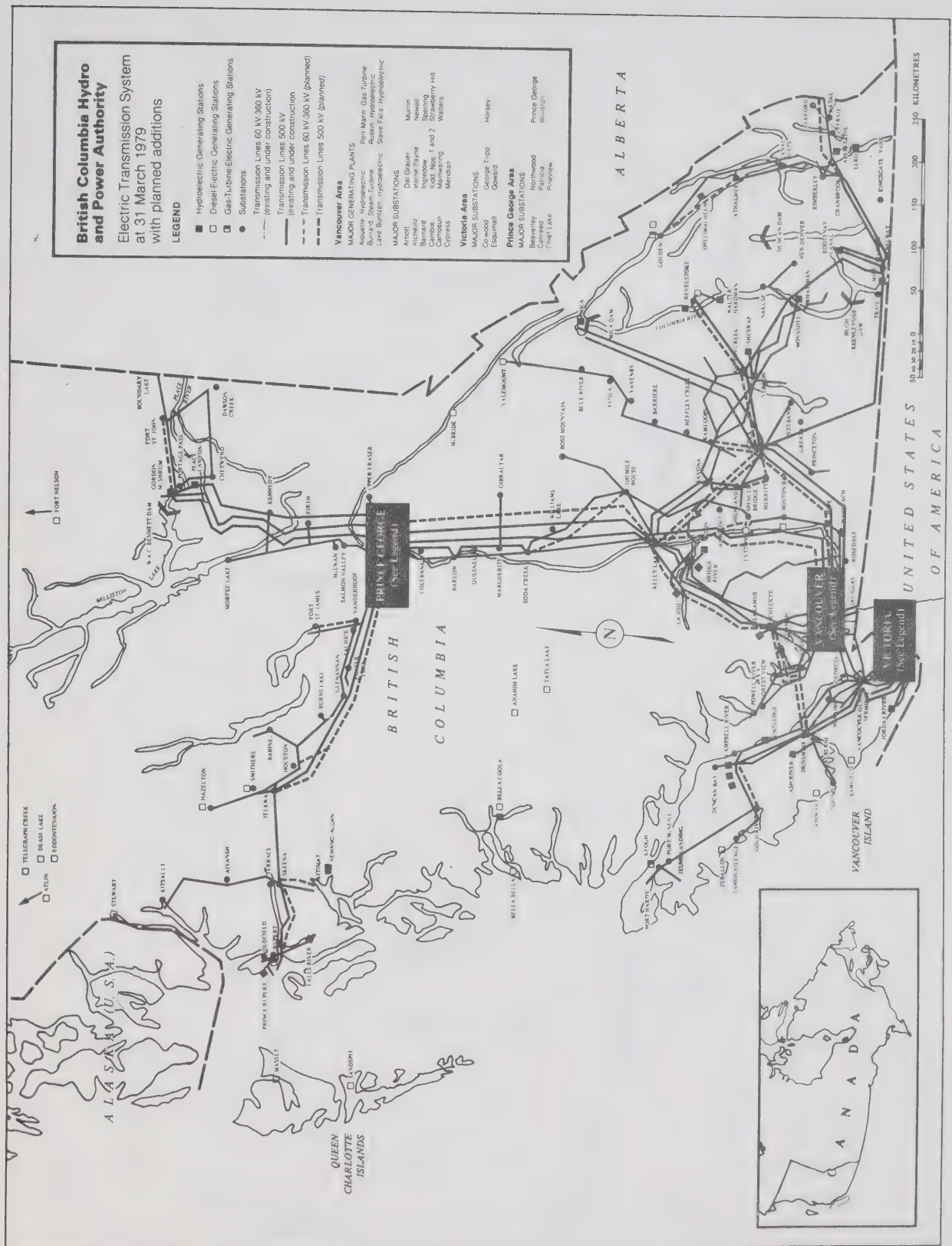
L.M. Thur
Presiding Member



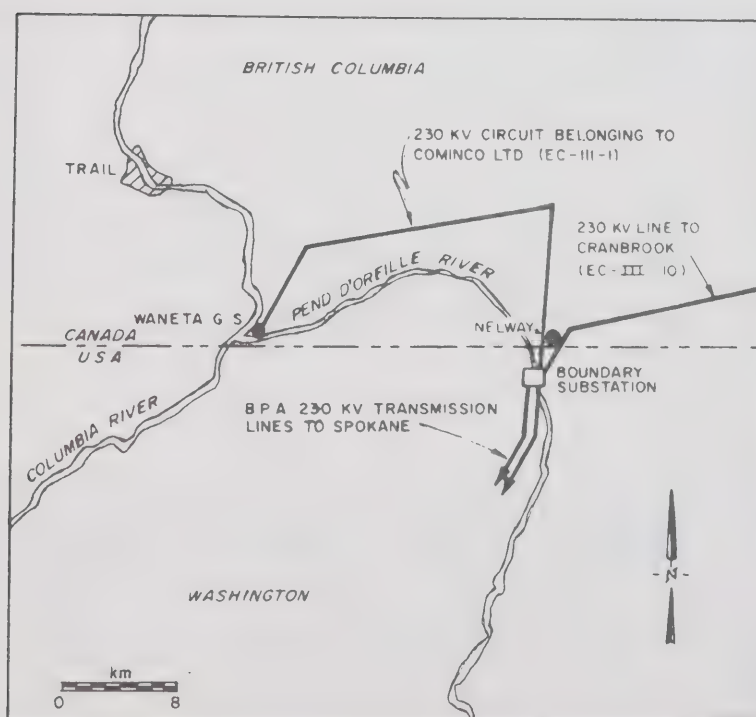
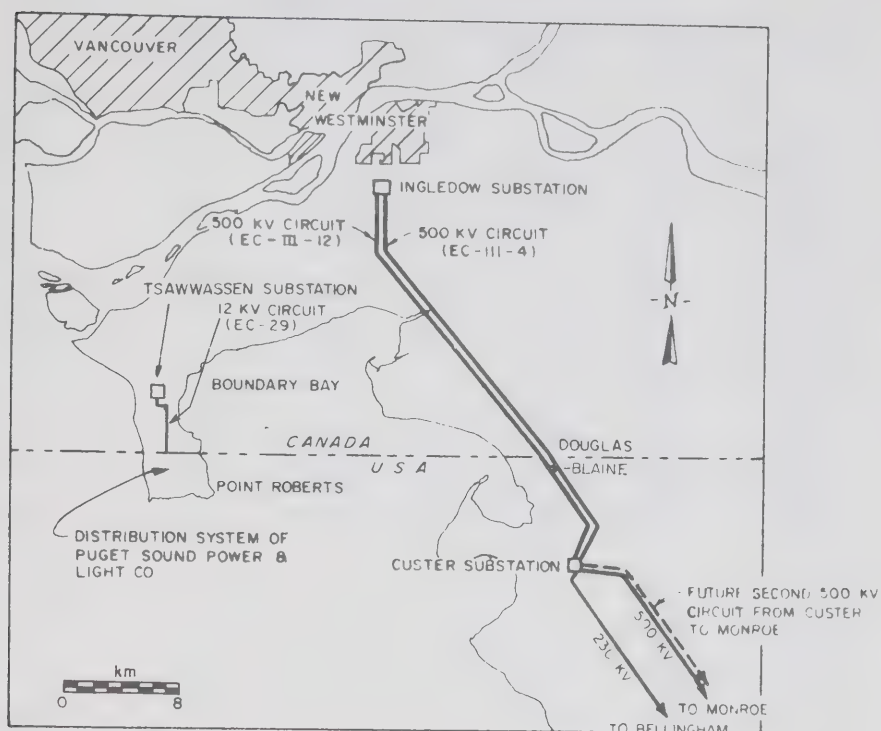
J.L. Trudel
Member



R.B. Horner
Member



BRITISH COLUMBIA HYDRO AND POWER AUTHORITY MAPS SHOWING INTERNATIONAL POWER LINES



BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
CAPACITY, DEMAND AND SURPLUS
AT TIME OF ANNUAL PEAK LOAD ON THE EXPORT GRID
(megawatts)

	79-80	80-81	81-82	82-83	Nov 83 (2)	83-84
Capacity - Hydro						
G.M. Shrum	2 405	2 680	2 680	2 680	2 680	2 680
Peace Canyon	--	700	700	700	700	700
Mica	1 600	1 600	1 600	1 600	1 600	1 600
Revelstoke	--	--	--	--	--	900
Seven Mile	177	529	529	529	529	529
Kootenay Canal	529	529	529	529	529	529
Bridge River	500	500	500	500	500	500
Cheakamus	144	144	144	144	144	144
John Hart	126	126	126	126	126	126
Small Hydro	<u>829</u>	<u>829</u>	<u>829</u>	<u>829</u>	<u>829</u>	<u>829</u>
Total Hydro	6 310	7 637	7 637	7 637	7 637	8 537
Capacity - Thermal						
Burrard	900	900	900	900	900	900
Small Thermal	<u>323</u>	<u>323</u>	<u>323</u>	<u>323</u>	<u>323</u>	<u>323</u>
Total Thermal	1 223	1 223	1 223	1 223	1 223	1 223
Power Purchase	175	175	175	175	175	175
TOTAL CAPACITY	7 708	9 035	9 035	9 035	9 035	9 935
FIRM DEMAND	5 350	5 758	6 230	6 740	6 900	7 320
Reserves and						
Surplus	2 358	3 285	2 805	2 295	2 135	2 615
Reserve	<u>1 200</u>	<u>1 220</u>	<u>1 200</u>	<u>1 200</u>	<u>1 200</u>	<u>1 400</u>
SURPLUS	1 158	2 065	1 605	1 095	935	1 215

NOTES:

1. Figures based on 1 October to 30 September Water Year.
2. In all years except 1983-84 the maximum FIRM DEMAND and minimum SURPLUS are forecast to coincide in December. In 1983-84 the minimum SURPLUS occurs in November and the maximum FIRM DEMAND occurs in December.
3. FIRM DEMAND is the estimated total for B.C. Hydro integrated system and includes the West Kootenay deficiency.
4. According to B.C. Hydro the Reserve is the reserve necessary to maintain an annual loss-of-load probability of not greater than one day in ten years.

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
ANNUAL ENERGY CAPABILITY, LOADS AND SURPLUS
DEPENDABLE STREAMFLOW CONDITIONS

	(gigawatt hours)				
	79-80	80-81	81-82	82-83	83-84
Capability - Hydro					
G.M. Shrum	10 274	9 031	12 208	14 817	12 462
Peace Canyon	1 040	2 290	3 070	3 840	3 330
Mica	7 380	7 140	6 945	8 150	5 960
Revelstoke	--	--	--	--	5 325
Seven Mile	1 610	2 915	3 110	2 470	2 490
Kootenay Canal	1 715	3 275	3 290	1 640	1 610
Bridge River	3 030	3 230	2 480	2 465	2 540
Cheakamus	890	835	715	670	880
John Hart	1 020	845	895	720	975
Small Hydro	<u>3 390</u>	<u>3 020</u>	<u>2 910</u>	<u>2 570</u>	<u>3 140</u>
Total Hydro	30 349	32 581	35 623	37 342	38 712
Capability - Thermal					
Burrard	5 125	5 125	5 125	5 125	5 125
Small Thermal	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
Total Thermal	5 125	5 125	5 125	5 125	5 125
Energy Purchase	1 200	1 200	1 200	1 200	300
TOTAL CAPABILITY	36 674	38 906	41 948	43 667	44 137
FIRM LOADS	<u>31 023</u>	<u>33 132</u>	<u>36 297</u>	<u>39 377</u>	<u>41 988</u>
SURPLUS	5 651	5 774	5 651	4 290	2 149

NOTES:

1. Figures based on 1 October to 30 September Water Year.
2. FIRM LOADS is the estimated total for B.C. Hydro integrated system and includes the West Kootenay deficiency.
3. Critical period from October 1940 to September 1945.
4. Burrard capability is based on a capacity factor of 65%.

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY
ANNUAL ENERGY CAPABILITY, LOADS AND SURPLUS
AVERAGE STREAMFLOW CONDITIONS

(gigawatt hours)

	79-80	80-81	81-82	82-83	83-84
Capability - Hydro					
G.M. Shrum	10 115	12 425	13 520	13 995	12 820
Peace Canyon	940	3 135	3 400	3 550	3 265
Mica	7 665	7 640	7 640	8 950	7 585
Revelstoke	--	--	--	--	6 460
Seven Mile	1 820	3 125	3 125	3 125	3 125
Kootenay Canal	3 145	3 145	3 145	3 145	3 145
Bridge River	2 910	2 910	2 910	2 910	2 910
Cheakamus	825	825	825	825	825
John Hart	930	930	930	930	930
Small Hydro	<u>3 340</u>	<u>3 340</u>	<u>3 340</u>	<u>3 340</u>	<u>3 340</u>
Total Hydro	31 690	37 490	38 835	40 770	44 405
Capability - Thermal					
Burrard	5 125	5 125	5 125	5 125	5 125
Small Thermal	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>--</u>
Total Thermal	5 125	5 125	5 125	5 125	5 125
Energy Purchase	1 200	1 200	1 200	1 200	300
TOTAL CAPABILITY	38 015	43 815	45 160	47 095	49 830
FIRM LOADS	<u>30 125</u>	<u>33 132</u>	<u>36 297</u>	<u>39 377</u>	<u>41 988</u>
SURPLUS	7 892	10 683	8 863	7 718	7 842

NOTES:

1. Figures based on 1 October to 30 September Water Year.
2. FIRM LOADS is the estimated total for B.C. Hydro integrated system and includes the West Kootenay deficiency.
3. Critical period from October 1940 to September 1945.
4. Burrard capability is based on a capacity factor of 65%.

DISPOSITION OF NOTICES OF MOTION FOR ADJOURNMENT -
12 DECEMBER 1979

"The National Energy Board has given careful consideration to the Notices of Motion filed on behalf of the Ladner Environmental Office, the Sierra Club of Western Canada, the Canadian Scientific Pollution and Environmental Control Society, the Union of British Columbia Indian Chiefs and the United Fishermen and Allied Workers' Union. The Board has also considered the argument presented by other intervenors in support of the motions and that submitted by British Columbia Hydro and Power Authority in opposition thereto.

Before making a ruling on each of the motions, the Board would like to set out guidelines on the evidence the Board is prepared to hear in these proceedings.

Part VI of the National Energy Board Act does not confer jurisdiction upon the Board to regulate the generation planning practices of a provincial utility and the manner in which that utility operates its generating system in order to meet its domestic load. The Board's function under Section 83 is to determine if a surplus exists on the utility's system taking into account the generation facilities which are in service or which may be put in service during the licence period under consideration and the domestic requirement in that same period.

The Board therefore will not, in these proceedings, examine B.C. Hydro's generation planning beyond the period covered by the licence applications.

One further aspect of the Board's jurisdiction under Section 83 is with respect to price. The Board has previously taken the position that it would consider all items of cost in Canada which are attributable to the activity of exporting power. Where, by reason of an export, increased costs are incurred in the operation of a generating system, the Board will take these increased costs into account in determining whether the lowest

price to be charged by an Applicant is just and reasonable in relation to the public interest. Such costs would include increased environmental costs or social costs resulting from the export.

Turning back to the four motions to adjourn, the Board will deal with them in the order they were presented.

The motion on behalf of the Ladner Environmental Office requested that B.C. Hydro prepare a number of issues to be settled by the Board. The first issue was whether the export prices should contain a component which represents funds necessary to provide indemnification to residents of the Columbia River Basin. In the Board's view this is not the proper forum to consider the Columbia River Treaty and the Board will only consider costs if it can be shown that those costs were incurred by reason of the export applied for in these applications.

The second and third issues referred to by the Ladner Environmental Office dealt with the effect of proposed changes in legislation in the United States. The Board does not feel that it would be proper or helpful to delay these proceedings to wait for United States legislation which may or may not be passed and may or may not have an effect on these applications.

Turning to the motion of the Sierra Club of Western Canada and the Canadian Scientific Pollution and Environmental Control Society, a request was also made for the preparation of an issue by B.C. Hydro. The information requested related to the timing of additions to generation, the cost of such additions including environmental and social cost and the proportion of such cost which relate to the proposed exports.

It is the view of the Board that although these matters may be relevant in these proceedings, they can be adequately dealt with in cross-examination.

The motion on behalf of the Union of British Columbia Indian Chiefs asked the Board to declare that the applications of B.C. Hydro were deficient in view of the requirements of Section 6 of the National Energy Board Part VI Regulations.

In argument with respect to Section 6, subsection (2)(n), the Union of B.C. Indian Chiefs wishes to examine the generation planning of B.C. Hydro far beyond the period sought in this application. The Board notes that the section itself refers to the "period for which the licence is sought" and to go beyond this period, even if it were within the Board's jurisdiction, would not be relevant in these proceedings.

Section 6, subsection (2)(z) requires that the Applicant demonstrate that the price is just and reasonable and, in particular, that it meet certain tests. The Applicant has provided some information on this item and the Board is of the view that many of the concerns as to price can be addressed in cross-examination.

Section 6, subsection (2)(aa) refers to evidence on any environmental impact that would result from the generation of the power for export. The Applicant has responded by stating that there would be no environmental impact. If, under cross-examination, some impact can be established, then further information may be required. A similar approach on Section 6, subsection (2)(w) would appear justified.

The motion of the United Fishermen and Allied Workers' Union essentially covers two points. First, the question of whether there was adequate time to prepare for this hearing and second, whether the Board should have provincial government policy before it in making a decision on this case.

With respect to time, the Board does have some sympathy with intervenors in this case on the timing, especially those who may have relied on the National Energy Board letter of August 27th, 1979.

As to the question of provincial policy, the Board notes that the hearing notice was published in British Columbia papers, that the Attorney-General of the Province was specifically served and that the province has an opportunity to present its views to the Board on these issues.

Although the Board has not addressed all the items raised in the motion, it has considered all points raised and, on the basis of this consideration, is prepared to grant an adjournment of this hearing. This ruling relates to the licence applications of B.C. Hydro only. The Board will hear the certificate application this morning.

When the hearing resumes, the Board expects that all parties will operate within the stated guidelines with respect to the hearing of evidence. At that time, the Board will hear evidence for the purpose of establishing whether or not the generating system of B.C. Hydro was constructed, or is being constructed, or will be operated in a different manner to meet export sales as opposed to domestic load.

Only if the evidence establishes that such is the case, that is, that the system is being constructed and operated differently because of export, will the Board hear any evidence to quantify additional costs in Canada.

It is the view of the Board that, that determination can take place on the basis of the information filed and the cross-examination of Hydro witnesses. Accordingly, the Board will not order B.C. Hydro to produce any further evidence at this time.

As B.C. Hydro is not being required to file further information, the Board is of the view that an adjournment until January 22 should be sufficient to allow parties time to prepare their cases. Therefore, the hearing of the licence applications will resume at 9:30 a.m. on January 22, 1980 in the Vancouver Island Room of the Hotel Vancouver."

DISPOSITION OF THE MATTER OF CONSTRUCTION AND
OPERATION FOR EXPORT - 29 JANUARY 1980

"The Board has considered all of the evidence and argument presented on the question of whether B.C. Hydro has constructed, is constructing, or will operate its system differently because of exports.

B.C. Hydro has clearly stated that its generation planning is based solely on its domestic load. Its method of forecasting that load has been the subject of extensive cross-examination in these proceedings. The Board notes that the forecasting of energy demand has been difficult over the past few years due to events on the domestic and international scenes. It appears to the Board that the load forecasts of B.C. Hydro which were made at the time decisions were taken to add generation to their system are quite high when compared to actual experience. However, evidence indicated that as load forecasts were reduced in recent years the schedule of generation additions during the licence period has been adjusted. For example, the Hat Creek project is not now planned to come into service during this period.

Under critical water flow conditions the evidence presented establishes that all projects up to and including Revelstoke must be on stream during the period under consideration to meet domestic load.

Therefore, it is the decision of the Board that B.C. Hydro has not constructed, is not constructing, and is not operating its system differently because of exports."

TERMS AND CONDITIONS OF EXPORT LICENCE

PART I - FIRM POWER AND ENERGY FOR POINT ROBERTS

1. The term of this licence shall commence on the 1st day of April 1980 and shall end on the 30th day of September 1984.
2. The class of inter-utility export transfer authorized hereunder is a sale transfer of firm power and energy ("power" as used herein means the rate of transferring electric energy, expressed in units of kilowatts or megawatts).
3. The power and energy to be exported hereunder shall be transmitted over the international power line for which the Board has issued Certificate of Public Convenience and Necessity Number EC-29.
4. The quantity of power that may be exported hereunder shall not exceed 7 000 kilowatts.
5. The quantity of energy that may be exported hereunder shall not exceed 32 million kilowatt hours in any consecutive 12-month period.
6. As a tolerance, the Licensee may export power at a rate momentarily in excess of that set forth in Condition 4 if such excess is caused by
 - (a) electrical short-circuit or other uncontrollable circumstances, or
 - (b) inability to control precisely the rate of transfer.
7. The price to be charged by the Licensee for power and energy exported hereunder shall be not less than 110 per cent of the price charged by the Licensee for similar sales to equivalent Canadian customers.
8. The Licensee shall, on or before the 1st day of June of each year comprised in the term of this licence, file with the Board copies of the rates then being charged for sales of power and energy under this licence and of the rates being charged for similar sales to equivalent Canadian customers.
9. The Licensee shall not, without the prior approval of the Board, amend, enter into any agreement in substitution for or in addition to, or terminate, the agreement dated 1 July 1976 between the Licensee and Puget Sound Power & Light Company.

10. The Licensee shall, within 15 days after the end of each month comprised in the term of this licence, file with the Board a report in such form and detail as the Board may specify, setting forth for that month
 - (a) the quantities of power and energy exported hereunder,
 - (b) the price charged therefor, and
 - (c) the resulting revenue expressed in Canadian dollars.

TERMS AND CONDITIONS OF EXPORT LICENCE

PART II - LOOP POWER AND ENERGY FLOW

1. The term of this licence shall commence on the 1st day of April 1980 and shall end on the 30th day of September 1984.
2. The class of inter-utility export transfer authorized hereunder is a carrier transfer of circulating loop power and energy flow for simultaneous return to Canada ("power" as used herein means the rate of transferring electric energy, expressed in units of kilowatts or megawatts).
3. The power and energy to be exported hereunder shall be transmitted over the international power lines for which the Board has issued Certificates of Public Convenience and Necessity numbered EC-III-4, EC-III-12, EC-III-10 and EC-III-1.
4. The quantity of energy that may be exported hereunder shall not exceed 2 000 gigawatt-hours in any consecutive 12-month period.
5. The Licensee shall, within 15 days after the end of each month comprised in the term of this licence, file with the Board a report in such form and detail as the Board may specify, setting forth for that month
 - (a) the quantity of energy exported hereunder,
and
 - (b) the corresponding quantity imported.

TERMS AND CONDITIONS OF EXPORT LICENCE

PART III - SHORT-TERM FIRM POWER AND ENERGY

1. The term of this licence shall commence on the 1st day of April 1980 and shall end on the 30th day of September 1984.
2. The classes of inter-utility export transfer authorized hereunder are sale and equichange transfers of short-term firm ("assured delivery") power and energy ("power" as used herein means the rate of transferring electric energy, expressed in units of kilowatts or megawatts).
3. The power and energy to be exported hereunder shall be transmitted over the international power lines for which the Board has issued Certificates of Public Convenience and Necessity numbered EC-III-4, EC-III-12, EC-III-10 and EC-III-1.
4. The quantity of power which may be exported by the Licensee hereunder shall not exceed the lesser of
 - (a) 2 000 megawatts, or
 - (b) the amount of capacity determined in accordance with condition 7, which is surplus to the maximum foreseeable requirements of the Licensee's system after allowing for maintenance and required reserve.
5. As a tolerance, the Licensee may export power at a rate momentarily in excess of that set forth in condition 4 if such excess is caused by
 - (a) electrical short circuit or other uncontrollable circumstance, or
 - (b) inability to control precisely the rate of transfer.
6. The quantity of energy that may be exported in any period within the term of this licence commencing on the 1st day of October of one year and ending on the 30th day of September of the next year (water year) shall not exceed the lesser of
 - (a) 3 000 gigawatt-hours, or
 - (b) the sum of
 - (i) 65 per cent of the energy surplus determined in accordance with condition 7, and
 - (ii) any energy imported, or available for import under a firm commitment, or as a return of energy exported hereunder.

7. To establish the capacity surplus referred to in sub-condition 4(b) and the energy surplus referred to in sub-condition 6(b), the Licensee shall file with the Board before the first export transfer is made hereunder, and thereafter annually, on or before the 31st day of July, an estimate of the supply, demand, and surplus capacity and energy for each month of the next three water years, which estimate, if approved by the Board, shall supersede all previous estimates of the surpluses.
8. The Licensee shall not export hereunder energy generated by the burning of oil.
9. The Licensee shall not, without the prior approval of the Board, export hereunder energy generated by the burning of natural gas or hydroelectric energy which would be replaced by thermally-generated energy, except that exports may continue during the operation of the Burrard plant where that plant has been placed in service
 - (a) to meet domestic needs, or
 - (b) to meet an emergency either in Canada or the United States.and has been kept in service purely for operational reasons.
10. The price to be charged by the Licensee for power and energy exported hereunder,
 - (a) shall be greater than the expected price for interruptible energy in the same period, and
 - (b) shall include a demand charge per megawatt of capacity committed, or a reasonable equivalent thereof, in addition to an energy charge.
11. The Licensee shall not commit any block of capacity or energy hereunder for a period of longer than twelve months from the date of making such commitment.
12. The Licensee, before committing any block of capacity or energy for export hereunder,
 - (a) shall first offer such capacity or energy to all economically accessible interconnected Canadian electric utilities on terms not less favourable to a purchaser than those on which the export would be made, and
 - (b) shall obtain Board approval of the proposed export agreement.

13. The Licensee shall not, without the prior approval of the Board, amend, enter into any agreement in substitution for or in addition to, or terminate, any of the agreements herein-after set forth:
 - (a) the Exchange Agreement, Contract No. 14-03-33266 dated 25 March 1970, between the Licensee and the Bonneville Administrator, as amended by the Agreement dated 26 October 1978;
 - (b) the Transmission Agreement, Contract No. EW-78-Y-83-0046 dated 26 October 1978, between the Licensee and the Bonneville Power Administration; and
 - (c) the Agreement dated 14 July 1978 between the Aluminum Company of Canada and the Licensee.
14. The Licensee, within 15 days after the end of each month comprised in the term of this licence, shall file with the Board a report in such form and detail as the Board may specify, setting forth for that month
 - (a) the quantities of power and energy exported hereunder, classified into types of transfer,
 - (b) the prices and resulting revenue expressed in Canadian dollars, and
 - (c) all energy imports corresponding to equichange transfers exported hereunder.

TERMS AND CONDITIONS OF EXPORT LICENCE

PART IV - INTERRUPTIBLE ENERGY - WASHINGTON WATER POWER COMPANY

1. The term of this licence shall commence on the 1st day of April 1980 and shall end on the 30th day of June 1984.
2. The class of inter-utility export transfer authorized hereunder is the sale of interruptible energy in accordance with the agreement dated 11 July 1978 between B.C. Hydro and the Washington Water Power Company.
3. The energy to be exported hereunder shall be transmitted over the international power lines for which the Board has issued Certificates of Public Convenience and Necessity numbered EC-III-4, EC-III-12, EC-III-10 and EC-III-1.
4. The quantity of energy authorized for delivery is as follows:

	<u>Year</u>	<u>Energy (MW.h)</u>
1 September 1978 - 31 August 1979		175 200
" 1979 - " 1980		527 040
" 1980 - " 1981		525 600
" 1981 - " 1982		525 600
" 1982 - " 1983		<u>525 600</u>
Total 1 September 1978 - 30 June 1984		2 279 040

The quantity scheduled for delivery in each year shall be exceeded only to make up any shortfall in the scheduled delivery in earlier years.

5. The quantity of power that may be exported by the Licensee hereunder shall not exceed 75 megawatts ("power" as used herein means the rate of transferring electric energy, expressed in units of kilowatts or megawatts).
6. As a tolerance, the Licensee may export power at a rate momentarily in excess of that set forth in Condition 5 if such excess is caused by
 - (a) electrical short circuit or other uncontrollable circumstance, or
 - (b) inability to control precisely the rate of transfer.
7. The Licensee shall not export hereunder energy generated by the burning of natural gas, or hydroelectric energy which would be replaced by thermally-generated energy, except that

exports may continue during the operation of the Burrard plant where that plant has been placed in service

- (a) to meet domestic needs, or
- (b) to meet an emergency either in Canada or the United States.

and has been kept in service purely for operational reasons.

8. The Licensee shall not export energy hereunder unless it is surplus to the firm energy requirements of economically accessible Canadian markets at the time it is exported.
9. The Licensee shall reduce or interrupt the delivery of energy hereunder whenever and to whatever extent such energy is required to supply
 - (a) any firm load within Canada, or
 - (b) any Canadian electric utility willing to buy, on an hourly basis, part or all of the energy at the same price as that of the export, adjusted for differences in the cost of delivery.
10. The price to be charged by the Licensee for energy to be exported hereunder as a sale transfer shall be as follows:

	Winter Rate (1 September - 31 March) mills/kW.h (U.S. funds)	Summer Rate (1 April - 31 August) mills/kW.h (U.S. funds)
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1 April 1980 - 31 Aug. 1980	-	11.25
1 Sept. 1980 - 31 Aug. 1981	17.00	12.50
1 Sept. 1981 - 31 Aug. 1982	17.50	13.75
1 Sept. 1982 - 31 Aug. 1983	18.00	15.00

11. The Licensee shall not, without the prior approval of the Board, amend, enter into any agreement in substitution for or in addition to, or terminate, any of the agreements hereinafter set forth:
 - (a) the Exchange Agreement, Contract No. 14-03-33266 dated 25 March 1970, between the Licensee and the Bonneville Administrator, as amended by the Agreement dated 26 October 1978;

- (b) the Transmission Agreement, Contract No. EW-78-Y-83-0046 dated 26 October 1978, between the Licensee and the Bonneville Power Administration;
- (c) the Agreement dated 11 July 1978 between the Licensee and the Washington Water Power Company; and
- (d) the Agreement dated 14 July 1978 between the Aluminum Company of Canada and the Licensee.

12. The Licensee, within 15 days after the end of each month comprised in the term of this licence, shall file with the Board a report in such form and detail as the Board may specify, setting forth for that month

- (a) the quantities of power and energy exported hereunder,
- (b) the price and resulting revenue expressed in Canadian dollars, and
- (c) the current month-end and cumulative amount of energy to be delivered to Washington Water Power in future to make up for non-delivery of contract quantities.

TERMS AND CONDITIONS OF EXPORT LICENCE

PART V - INTERRUPTIBLE ENERGY

1. The term of this licence shall commence on the 1st day of April 1980 and shall end on the 30th day of September 1984.
2. The classes of inter-utility export transfer authorized hereunder are sale, equichange, storage, carrier and adjustment transfers of interruptible energy.
3. The energy to be exported hereunder shall be transmitted over the international power lines for which the Board has issued Certificates of Public Convenience and Necessity numbered EC-III-4, EC-III-12, EC-III-10 and EC-III-1.
4. The quantity of energy that may be exported hereunder in any period within the term of this licence commencing on the 1st day of October and ending on the 30th day of September (water year) when combined with the amounts exported during the same period under the licences authorizing the export of short term firm power, and interruptible energy to Washington Water Power Company, shall not exceed
 - (a) in the water year 1979-80, 10 000 gigawatt-hours less the quantity of energy exported during that water year under Licences EL-88 and EL-89, and
 - (b) in each of the water years 1980-81, 1981-82, 1982-83 and 1983-84, 10 000 gigawatt-hours.
5. The Licensee shall not export hereunder energy generated by the burning of oil.
6. The Licensee shall not, without the prior approval of the Board, export hereunder energy generated by the burning of natural gas, except under the circumstances defined in sub-condition 9(a)(ii) and in condition 10 hereunder.
7. The Licensee shall not export energy hereunder unless it is surplus to the firm energy requirements of economically accessible Canadian markets at the time it is exported.
8. The Licensee shall reduce or interrupt the delivery of energy hereunder whenever and to whatever extent such energy is required to supply
 - (a) any firm load within Canada, or
 - (b) any Canadian electric utility willing to buy part or all of the energy at the same price as that of the export, adjusted for differences in the cost of delivery.

9. The price to be charged by the Licensee for energy to be exported hereunder as a sale transfer shall not be less than:
 - (a) in the case of thermally-generated energy
 - (i) 105 per cent of the incremental production cost calculated for natural gas valued at the export price thereof from British Columbia under Licence No. GL-41 at the time the export is being made, plus 3.0 mills per kilowatt-hour, or
 - (ii) in the case of emergency energy (herein defined as energy supplied for a period not exceeding 24 hours to a party during an emergency on its system which impairs or jeopardizes the ability of that party to supply its firm system demand) 105 per cent of the Licensee's incremental fuel cost, plus 3.0 mills per kilowatt-hour;
 - (b) in the case of hydroelectric energy
 - (i) for any portion of the energy that would probably be replaced by thermally-generated energy, the replacement cost calculated as in sub-condition 9(a)(i) above, or
 - (ii) 7 mills per kilowatt-hour, or the then current price paid to the Aluminum Company of Canada, pursuant to the agreement dated 14 July, 1974, except with immediate notification and explanation to the Board by telex.
10. An export which occurs at a time when the Burrard thermal plant is operating shall, to the extent of the net output of the Burrard plant at that time, be deemed to be an export of thermally-generated energy, except in cases where the Burrard plant has been started up for domestic needs and is kept in service purely for operational reasons.
11. The Licensee shall not, without the prior approval of the Board, amend, enter into any agreement in substitution for or in addition to, or terminate, any of the agreements hereinafter set forth:
 - (a) the Exchange Agreement, Contract No. 14-03-33266 dated 25 March 1970, between the Licensee and the Bonneville Administrator, as amended by the Agreement dated 26 October 1978;

- (b) the Transmission Agreement, Contract No. EW-78-Y-83-0046 dated 26 October 1978, between the Licensee and the Bonneville Power Administration;
 - (c) the Agreement dated 11 July 1978 between the Licensee and the Washington Water Power Company; and
 - (d) the Agreement dated 14 July 1978 between the Aluminum Company of Canada and the Licensee.
12. The Licensee shall report to the Board monthly, the maximum and minimum water flows in the Nechako River.
13. The Licensee shall not, without the prior approval of the Board, enter into any agreement to sell interruptible energy under terms of delivery or price which involve a commitment of longer than one month in duration.
14. The Licensee, throughout the term of this licence, shall forthwith provide the Board with three copies of every report that is made public concerning any environmental effect of generating power and energy at the Burrard thermal plant.
15. The Licensee, within 15 days after the end of each month comprised in the term of this licence, shall file with the Board a report in such form and detail as the Board may specify, setting forth for that month
- (a) the quantities of energy exported hereunder, classified into types of transfer,
 - (b) the price and resulting revenue of each type expressed in Canadian dollars,
 - (c) for each sale transfer, the derivation of the price, including the steps taken to ensure that such price was the maximum obtainable,
 - (d) all energy imports corresponding to equichange and storage transfers exported hereunder, and
 - (e) the current month-end balance in each energy exchange account maintained by the Licensee with a utility in the United States.



